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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

4383 P

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

10/A048124

INTERNATIONAL APPLICATION NO.

PCT/AU00/00364

INTERNATIONAL FILING DATE

26 APRIL 2000

PRIORITY DATE CLAIMED

22 APRIL 1999

TITLE OF INVENTION

WIRELESS VIDEO SURVEILLANCE SYSTEM

APPLICANT(S) FOR DO/EO/US

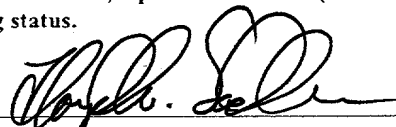
GONZALEZ

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(3)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☒ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 16 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

U.S. APPLICATION NO. (if known, see 37 CFR 1.51) <b>10/4048124</b>		INTERNATIONAL APPLICATION NO. <b>PCT/AU00/00364</b>		ATTORNEY'S DOCKET NUMBER <b>4383 P</b>	
17. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$1040.00</b> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$860.00</b> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$710.00</b> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$690.00</b> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$100.00</b> <div style="text-align: right;"><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b></div>				<b>CALCULATIONS PTO USE ONLY</b>  <div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
				<b>\$ 1040.00</b>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				<b>\$</b>	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	<b>33 - 20 =</b>	<b>13</b>	<b>X \$18.00</b>	<b>\$ 234.00</b>	
Independent claims	<b>- 3 =</b>		<b>X \$18.00</b>	<b>\$</b>	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			<b>+ \$270.00</b>	<b>\$</b>	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$</b>	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				<b>\$</b>	
<b>SUBTOTAL =</b>				<b>\$ 1274.00</b>	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				<b>\$</b>	
<b>TOTAL NATIONAL FEE =</b>				<b>\$ 1274.00</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property				<b>\$ 40.00</b>	
<b>TOTAL FEES ENCLOSED =</b>				<b>\$ 1314.00</b>	
				Amount to be refunded:	<b>\$</b>
				charged:	<b>\$</b>
a. <input checked="" type="checkbox"/> A check in the amount of <b>\$ 1314.00</b> to cover the above fees is enclosed.  b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <b>50-0581</b> . A duplicate copy of this sheet is enclosed.					
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>					
SEND ALL CORRESPONDENCE TO:					
 SIGNATURE:					
<b>Lloyd W. Sadler</b> NAME					
<b>40154</b> REGISTRATION NUMBER					

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

INVENTOR: Ruben Gonzalez

ASSIGNEE: ACTIVESKY, INC.

SERIAL NUMBER: n/a

DATE FILED: n/a

INT'L PUB. NO.: WO 01/06791 A1

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INT'L FILING DATE: 24 April 2000

PRIORITY DATE: 22 April 1999

TITLE: WIRELESS VIDEO SURVEILLANCE SYSTEM

ATTORNEY DOCKET: 4383 P

Commissioner for Patents  
Box PATENT APPLICATION  
Washington, DC 20231

**PRELIMINARY AMENDMENT**

Honorable Commissioner:

Applicant respectfully requests that the following preliminary amendment be entered in this patent case. The purpose of this amendment is conform the claims to U.S. practice and is not to add any new matter.

**AMENDMENT "A"**

In the claims:

Please amend claims 17, 20, 21, 22, 23, and 24 as follows:

10048124-1048124

Please replace claim 17 with the following "clean version" of the amended claim.

17. The wireless video surveillance system of claim 1 further comprising motion detecting means for detecting motion occurring within said scene.

10043134-103401

Version of claim 17 "with markings to show changes made."

17. (once amended) The wireless video surveillance system of claim 1 [any one of claims 1-16] further comprising motion detecting means for detecting motion occurring within said scene.

FOOTNOTES

Please replace claim 20 with the following "clean version" of the amended claim.

20. The wireless video surveillance system of any one of claim 17 further comprising selection means for selection of a video camera with is closest to the detected motion.

FOOTNOTES

Version of claim 20 "with markings to show changes made."

20. (once amended) The wireless video surveillance system of any one of claim 17 [claims 17-19] further comprising selection means for selection of a video camera with is closest to the detected motion.

10045144 10045144





Version of claim 21 "with markings to show changes made."

21. (once amended) The wireless video surveillance system as claimed in claim 1 [any one of claims 1-20] further comprising video footage storage means which can be viewed on command from the portable monitor device.

100434-100434

Please replace claim 22 with the following "clean version" of the amended claim.

22. The wireless video surveillance system as claimed in claim 1 further comprising audio footage storage means which can be viewed on command from the portable monitor device.

1004434-40491

Version of claim 22 "with markings to show changes made."

22. (once amended) The wireless video surveillance system as claimed in claim 1 [any one of claims 1-21] further comprising audio footage storage means which can be viewed on command from the portable monitor device.

FOIA b 7 - DATED 10/24/2014

Please replace claim 23 with the following "clean version" of the amended claim.

23. The wireless video surveillance system as claimed in claim 17 wherein the interface module further comprises alarm activation means for activation of an alarm if motion is detected by the motion detecting means.

TO: "TAT" 10/10/10

Version of claim 23 "with markings to show changes made."

23. (once amended) The wireless video surveillance system as claimed in claim 17 [any one of claims 17-22] wherein the interface module further comprises alarm activation means for activation of an alarm if motion is detected by the motion detecting means.

10049434-100494

Please replace claim 24 with the following "clean version" of the amended claim.

24. The video surveillance system as claimed in any one of claim 1 further comprising audio detecting means for detecting sound which originates from within said scene.

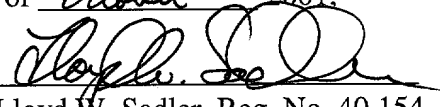
104434-104434

Version of claim 24 "with markings to show changes made."

24. (once amended) The video surveillance system as claimed in any one of claim 1 [claims 1-23] further comprising audio detecting means for detecting sound which originates from within said scene.

100424-10404

Respectfully submitted this 21 day of October 2001.

  
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10045144-103101



## WIRELESS VIDEO SURVEILLANCE SYSTEM

This invention relates to an apparatus and method for wireless video surveillance and communication. In particular, it relates to an apparatus and method employing commercially available, hand-held  
5 portable devices, such as personal information managers and personal digital assistants.

### BACKGROUND TO THE INVENTION

The use of personal digital assistants (PDA's), such as the  
10 3COM Palm Pilot®, is becoming very widespread. Functionality of PDA's varies between manufacturers but all include a liquid crystal display, an input device, memory and a processor unit. Various improvements are constantly being made to increase available memory, improve processing power and extend software applications.

15 Recently, PDA manufacturers have released devices having colour liquid crystal displays and wireless communication capability. This innovation has been driven by a desire to provide PDA's with internet access for web surfing and e-mail. Similar market pressures are driving the integration of processing capability into mobile phones to  
20 facilitate direct web access for the same purposes.

It is also known to integrate PDA's with mobile phones to provide an integrated system giving full voice and data transfer facilities. One such system is described in United States patent number 5625673, assigned to Lucent Technologies Inc. The patent describes a PDA that  
25 includes means for cordless connection to specialised accessories, such as a cellular telephone and a modem.

The capabilities of PDA's have not been extended for application in the video surveillance area. Existing surveillance systems, such as house security systems, do not normally offer a video surveillance  
30 capability. When such a capability is provided, it is usually linked to a base station that provides remote manual surveillance.

The majority of existing surveillance systems utilise a local processing centre that packets data for transmittal to the base station. Transmittal may be by dedicated land-line or may be via a dial-up connection.

5

## OBJECT OF THE INVENTION

It is an object of the invention to provide an apparatus and method for wireless video surveillance.

## 10 SUMMARY OF THE INVENTION

In one form, although it need not be the only, or indeed the broadest form, the invention resides in a wireless video surveillance system comprising:

- a portable monitor device and first wireless communication means;
- 15 one or more video recording means for recording video images of a scene; and
- at least one interface module converting said video images to transmittable data, said interface module incorporating a second wireless communication means for transmission of said transmittable
- 20 data from said at least one interface module to said portable monitor device, said portable monitor device incorporating means for receiving said transmittable data, converting said transmittable data to said video images and displaying said video images.

- In preference, the portable monitor device is a personal digital
- 25 assistant or similar hand-held processing unit incorporating processor means, memory means and video display means.

The video recording means may be a digital camera or may be a commercially available analogue video camera, such as a Camcorder®.

- Suitably, the interface module includes input means for receiving
- 30 video signals from said video recording means. A suitable input port is a USB port for digital video input. If an analog video recording means is employed, the input means suitably includes a video input port and

analog to digital conversion means.

The interface module preferably also includes processing means for converting said video images to transmittable data and one or more transmission buffers.

5        The second wireless communication means is suitably a signal transmitting means but is preferably a signal receiving and transmitting means.

10        The processing means of the interface module is suitably programmed with video and audio compression algorithms. Corresponding audio and video decompression algorithms are suitably programmed in the processor means of the portable monitor device.

15        The portable monitor device suitably also includes input means for inputting signals for transmitting to said interface module. Preferably said first wireless communication means includes means for transmitting said signals and said second wireless communication means includes means for receiving said signals.

20        In a further form, the invention resides in a method of providing wireless video surveillance including the steps of:  
recording a video image of a scene;  
processing the recorded image to form data for wireless transmission;  
transmitting the data to a portable monitor device; and  
processing the data to display the image on the portable monitor device.

25        Processing the recorded image preferably includes the steps of compressing the image at the interface means and decompressing the image at the portable monitor device.

The method may further include the step of storing said data for later transmission.

#### BRIEF DESCRIPTION OF THE DRAWINGS

30        Preferred embodiments of the invention are described with reference to the following figures in which:

FIG 1 is a block diagram of a first embodiment of the invention;

FIG 2 is a block diagram of a first embodiment of the interface module;  
FIG 3 is a block diagram of a second embodiment of the interface  
module;

FIG 4 is a block diagram of a third embodiment of the interface module;

5 FIG 5 is a block diagram of the portable video monitor;

FIG 6 is a block diagram of a second embodiment of the invention; and

FIG 7 is a block diagram of a third embodiment of the invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

10 Referring to FIG 1 there is shown a block diagram of a wireless  
video surveillance system consisting of a video recording means 1, in  
signal connection with an interface module 2 which is in signal  
connection with an antenna 3. Signals 4 are transmitted between the  
antenna 3 and an antenna 5 associated with a portable monitor device  
15 6 which is a personal digital assistant or portable personal computer.  
Video images from the recorder 1 are displayed on a display 7 of the  
monitor 6.

Video and audio signals are transmitted from the interface  
module to the portable monitor device and control signals may be  
20 transmitted from the portable monitor device to the interface module.

The video recording means 1 is a commercially available VHS  
video recorder having standard video and audio outputs. Other video  
formats may include PAL, NTSC, SVHS, BETACAM, RGB, SECAM  
and DVD.

25 A first preferred embodiment of the interface module 2 is shown  
in greater detail in FIG 2. In this embodiment the interface module is  
configured to transmit signals to the portable monitor device but is not  
configured to receive signals. Video and audio input from the recorder 1  
is input through port 8 and converted to digital form in analogue to  
30 digital converter 9. The output from the ADC is buffered in dual frame  
buffer 10 for input to a digital signal processor 11.

Alternatively a digital camera could be employed as the video recording means 1. In this case, the digital output from the camera can be input directly to the dual frame buffer 10 through USB port 12. Although a USB port is described in the preferred embodiment, it will be appreciated  
5 that other interface protocols such as SCSI, IEEE 1394, etc, can be used.

The digital signals are processed for transmission in the digital signal processing chip 11. The required processing will depend on the transmission network being employed and known signal processing and compression algorithms can be used. Suitable algorithms include H.261,  
10 H.263, MPEG1, MPEG2, MPEG4, etc. Random access memory 13 is provided for on-board storage of data for signal processing.

Although a software implementation of the signal processing has been described, a hardware implementation is also suitable. In one embodiment, signal processing can be performed using an ASIC  
15 (Application specific integrated circuit)/FPGA (Field programming gate array) solution. Alternatively, an ASIC front end can be used with a programmable DSP backend. The invention is not limited to any one of these possible solutions.

If a DSP solution is used, the DSP is programmed with available  
20 compression software. The invention is not limited to any particular software solution, although the inventor has found that 8-bit and 24-bit coding methods are suitable. Different coding methods may be more suitable for certain colour video displays available in the wide variety of PDA's currently on the market. New coding solutions are regularly  
25 becoming available and the inventor recognises that the invention may employ new algorithms in the future.

The selected video compression method will implement three basic stages. The first stage performs temporal decorrelation, also termed interframe coding. This process consists of an optional block based  
30 motion compensation step followed by temporal prediction and replenishment. This determines which portions of the image frame have

being transmitted by transmission module 15. The transmission module 15 can be any suitable wireless transmission system such as CDMA (code division multiple access), TDMA (time division multiple access), IP (wireless internet protocol), PHS (personal handyphone system), LMDS (local multipoint distribution service), wireless ATM, GSM, GPRS, HSCSD and other 3G wireless networks. Alternative embodiments are discussed in detail below.

It will be appreciated that the elements of the interface module need not be physical contained in a single device. For example, the transmission module may be separate from the rest of the interface module. For a wireless WAN protocol, the transmission module may be a GSM or CDMA base station connected to the rest of the interface module by a modem or ISDN connection. If the communication protocol is a wireless LAN, the transmission module may be connected to a separate base station or wireless access point by an ethernet.

A second embodiment of the interface module is shown in FIG 3. This embodiment is configured to transmit signals to the portable monitor device as well as receive control signals. The DSP is replaced with a general purpose CPU 16. As with the first embodiment, video and audio signals are received at input 8, digitised by ADC 9, and buffered in DFB 10. Signals from a digital source can be input directly on input 12.

As well as RAM 13 for local storage, an external storage device 17 is provided. The external storage device allows large volumes of data to be stored which can be accessed by signals from the portable monitor device. Two types of external storage devices may be provided. Uncompressed analogue video data must be stored in a VCR which is accessed by a sequential, read-only access. Compressed digital data can be stored on any of a number of suitable devices (including magnetic disks drives, digital tape drives, CD ROMs, DVDs, WORM drives, etc) with read-write, random access. There may be multiple external storage

devices.

The external storage devices permit a history of video and audio signals to be stored for review at a later time. One application of this arrangement is the removal and storage of recordings, such as video and  
5 audio tapes, for use in legal proceedings that could result from security breaches detected by the invention. Other applications are discussed below.

Signals 4 are sent and received by a transmit/receive means 18. A number of buffers 19 are provided for both transmission and reception. An  
10 output means 20 provides analogue or digital signals at port 21 for controlling various other devices in response to signals received from the portable monitor device. For example, a signal from the portable monitor device could be used to turn lights on or off, reset a motion detector or external alarm, or commence video recording. In one application, a signal  
15 from the portable monitor device could be used to commence playback of a prerecorded programme stored on the external storage device 17.

A third embodiment of the interface module 2 is shown in FIG 4. This embodiment differs from the second embodiment by implementing a multiple address data bus 22. This embodiment facilitates the use of  
20 multiple external storage devices and multiple output means. It is also possible to implement multiple input sources which may each have a unique address selectable from the portable monitor device. This embodiment provides maximum flexibility to the wireless video surveillance system. For example, the range of devices connected to the  
25 interface module may include a number of video cameras, one or more external movement detectors and multiple control lines (such as light switches). Detection of movement would generate a warning signal that is transmitted to the portable monitor device. The user would then transmit a signal to select the video camera closest to the detected movement. The  
30 video is then visible in the LCD 7 of the monitor 6.

The important elements of the portable monitor device 6 are shown in greater detail in FIG 5. The monitor includes a receive/transmit module

23 for receiving the data transmitted by the interface module 2 and transmitting data to the interface module. Buffers 24 are provided for both transmission and reception. Received signals are processed in the CPU 25. On-board RAM 26 stores data and parameters for the signal  
5 processing. The processed image is displayed on the liquid crystal display 7. Control signals input on line 27 are processed by the CPU 25 and transmitted to the interface module 2.

The portable monitor device can be any device capable of wireless network connection that has a graphic display and a general purpose  
10 processor. PDAs are preferred due to their availability but many mobile phones, such as WAP phones and I-NET phones are also suitable. Naturally, purpose built devices will also be suitable. The inventor envisages that hybrid devices that interface a custom DSP with a standard PDA will be useful. In this form, the video decoding process may be  
15 performed in the custom DSP instead of the CPU of the PDA.

Fig 6 shows an embodiment in which a VHS video camera 28 is connected to an interface module 29 that provides a low power signal 30 to an antenna 31 for a local area network. This embodiment may have a typical range of 150m for signals 30. The signals 30 are typically radio  
20 frequency signals although infrared signals may also be suitable in point to point applications.

The monitor device 33 is a personal digital assistant with a wireless network card 34 and antenna 32 to receive signals 30. The wireless network card 34 interfaces to the personal digital assistant through a  
25 PCMCIA slot, compact flash port, or other expansion port.

The embodiment of Fig 6 supports simplex video and full duplex



audio communication. It is most suitable for implementation in domestic applications, for child minding and security. For example, a parent may use the configuration to monitor a child sleeping in a separate room. Another application is to monitor an entryway. The full duplex audio  
5 allows communication with a person seeking entrance while the simplex video channel allows the person to be viewed.

The primary advantage of the embodiment of Fig 6 is that the video monitor is portable and therefore the user can move freely around the home. It will be appreciated that this is a significant  
10 improvement over known prior art security and child-minding systems.

For longer range applications the embodiment of Fig 7 is preferable. A digital video camera 35 provides audio and video input to the interface module 36. The transmission module 37 is a standard telephone interface for transmitting signals 38 across a CDMA or GSM  
15 cellular phone network from antenna 39. The monitor device comprises a personal digital assistant 40 with a modem 41 connected to a phone 42. The PDA is programmed with algorithms to process the received data for display.

In a variation of this embodiment the PDA and phone are  
20 integrated into a single device. Suitable devices have recently become commercially available.

As mentioned above, the embodiments provide simplex video and duplex audio communication. The second embodiment provides duplex audio via the phone. Duplex audio communication for the first  
25 embodiment may be provided by built-in microphones provided in some PDA's or by an external microphone coupled to the network card.

These embodiments may be extended by providing local storage of audio and video footage which can be viewed on command from the monitor. Movement and sound detection functionality have also been  
30 provided in the interface module so that an alarm can be provided if movement or sound is detected in the viewed scene. Combined movement detection, sound detection and local video storage are

particularly useful for the second embodiment to facilitate dial-up operation.

In one method of operation, the interface module is configured to detect movement in the field of view. When movement is detected the video footage is stored locally and a call is placed to the portable monitor device. The phone touch tones or the duplex audio channel may then be used to send tone commands to trigger replay of the stored video footage. The great advantage of this systems is that security is provided without the need of a fixed base station with permanent monitoring.

The external storage may be used to store a fixed period of data in one or more FIFO buffers. The size of the FIFO buffers (and hence the length of recorded video) can be a user set variable. When movement is detected the user can choose to view a block of video from a fixed period before the alarm.

It will be appreciated that multiple cameras and interface modules can be programmed to a single or multiple video monitors. It would therefore be possible for a number of security guards to carry personal digital assistants providing mobile monitoring of multiple camera installations.

Although the above embodiments only offer simplex video communication, it will be appreciated that the invention is not limited to this implementation. The provision of simplex rather than duplex video is due to the processing power available in commercial PDA's. Improved processing power will allow the PDA's to run software that permits compression and transmission of video images. A video recording means is added to the portable monitor device for duplex video transmission.

It will be appreciated that suitable network protocols must be used to ensure that video data is reliably transmitted across the wireless link to the remote monitor. These may be connection oriented, such as TCP, or connectionless, such as UDP. The nature of the

protocol will change depending on the nature of the wireless network being used, the bandwidth, and the channel characteristics. The protocol must perform the following functions: error control; flow control; packetisation; connection establishment; and link management.

5           There are many existing protocols for these purposes that have been designed for use with data networks. However in the case of video, special attention may be required to handle errors since retransmission of corrupted data is inappropriate due to the real-time constraints imposed by the nature of video on the reception and processing of transmitted data.

10           To handle this situation the following error control scheme is provided.

(1) Frames of video data are individually sent to the receiver, each with a check sum or cyclic redundancy check appended to enable the receiver to assess if the frame has been received in error;

15           (2a) If there was no error then the frame is processed normally;

(2b) If the frame is in error then the frame is discarded and a status message is sent to the transmitter indicating the number of the video frame that was in error;

20           (3) The video transmitter upon receiving such an error status message stops sending all predicted frames and instead immediately sends the next available key frame to the receiver;

(4) After sending the key frame the transmitter resumes sending normal interframe coded video frames until another error status message is received.

25           A key frame is a video frame that has only been intraframe coded but not interframe coded. Interframe coding is where the prediction processes is performed and makes these frames dependent on all the preceding video frames after and including the last key frame. Key frames are only sent as the first frame and whenever an error occurs. The first  
30           frame needs to be a key frame because there is no previous frame to predict from to perform the interframe coding

process.

Although the primary application is envisaged as being point-to-point, a broadcast implementation is also possible. In this case, there may be multiple monitors for a single base station. This implementation  
5 may be particularly useful in a facility security application where a number of guards are monitoring the security of a facility from a variety of locations.

Authentication security may also be incorporated into the system to minimise the risk of unauthorised use if the portable monitor device  
10 is lost or stolen. Suitable security protocols will be known to persons skilled in this area.

Throughout the specification the aim has been to describe the invention without limiting the invention to any specific combination of features.  
15

CLAIMS

1. A wireless video surveillance system comprising:
  - a) one or more video recording means for recording video images of a scene;
  - 5 b) at least one interface module for converting said video images to transmittable data; and
  - c) a hand-held portable monitor device comprising conversion and display means for respective conversion of said transmittable data to said video images, and display of said video images, said
- 10 portable monitor device having first wireless communication means associated therewith for receiving said transmittable data from said interface module; wherein  
said interface module comprises second wireless communication means for transmission of said transmittable data from said interface
- 15 module to said portable monitor device.
2. The wireless video surveillance system of claim 1 wherein the portable monitor device is a personal digital assistant or similar hand-held processing unit incorporating processor means, memory means and display means.
- 20 3. The wireless video surveillance system of claim 1 wherein the interface module includes input means for receiving video signals from said video recording means.
4. The wireless video surveillance system of claim 1 wherein the video recording means is a digital camera
- 25 5. The wireless video surveillance system of claim 1 wherein the video recording means is an analogue video camera.
6. The wireless video surveillance system of claim 5 wherein the interface module includes a video input means and analog to digital conversion means.
- 30 7. The wireless video surveillance system of claim 1 wherein the interface module includes processing means for converting said video images to transmittable data and one or more transmission buffers.

8. The wireless video surveillance system of claim 7 wherein the processing means is programmed with video and audio compression algorithms.
9. The wireless video surveillance system of claim 1 wherein the  
5 interface module includes processing means programmed with video and audio compression algorithms and wherein the portable monitor device incorporates a processor means programmed with corresponding audio and video decompression algorithms.
10. The wireless video surveillance system of claim 1 wherein the first  
10 wireless transmission means is a signal receiving means.
11. The wireless video surveillance system of claim 1 wherein the first wireless transmission means is a signal receiving and transmitting means.
12. The wireless video surveillance system of claim 1 wherein the second wireless communication means is a signal transmitting means.
- 15 13. The wireless video surveillance system of claim 1 wherein the second wireless communication means is a signal receiving and transmitting means.
14. The wireless video surveillance system of claim 1 wherein the second wireless communication means is integral with said interface  
20 module.
15. The wireless video surveillance system of claim 1 wherein the portable monitor device includes input means for inputting signals for transmitting to said interface module.
16. The wireless video surveillance system of claim 15 wherein said  
25 first wireless communication means includes means for transmitting said signals and said second wireless communication means includes means for receiving said signals.
17. The wireless video surveillance system of any one of claims 1-16 further comprising motion detecting means for detecting motion occurring  
30 within said scene.
18. The wireless video surveillance system of claim 17 wherein the motion detecting means activates a warning signal when a predetermined

threshold amount of movement is detected by the motion detecting means.

19. The wireless video surveillance system of claim 18 wherein said warning signal is transmitted to the portable monitor device.

5 20. The wireless video surveillance system of any one of claims 17-19 further comprising selection means for selection of a video camera which is closest to the detected motion.

21. The wireless video surveillance system as claimed in any one of claims 1-20 further comprising video footage storage means which can be  
10 viewed on command from the portable monitor device.

22. The wireless video surveillance system as claimed in any one of claims 1-21 further comprising audio footage storage means which can be viewed on command from the portable monitor device.

23. The wireless video surveillance system as claimed in any one of  
15 claims 17-22 wherein the interface module further comprises alarm activation means for activation of an alarm if motion is detected by the motion detecting means.

24. The video surveillance system as claimed in any one of claims 1-23  
20 further comprising audio detecting means for detecting sound which originates from within said scene.

25. The video surveillance system as claimed in claim 24 wherein the interface module further comprises alarm activation means for activation of an alarm if sound is detected by said audio detecting means.

26. A method of providing wireless video surveillance including the  
25 steps of:

recording a video image of a scene;

processing the recorded image to form data for wireless transmission;

transmitting the data to a hand-held portable monitor device;

processing the data to display the image on the portable monitor device,

30 wherein the step of processing the recorded image includes the further steps of compressing the image prior to transmission of the image to the portable monitor device and

decompressing the image at the portable monitor device.

27. The method of claim 26 wherein the step of compressing the image comprises the following sequential steps:

- (1) Temporal decorrelation to determine which portions of an image frame  
5 have changed to enable information to be selectively updated to reproduce the changes;
- (2) Interframe coding comprising decomposition of interframe images resulting from step (1) into basic coding units and substantial quantisation of the basic coding units to eliminate unwanted information; and;
- 10 (3) Reordering of symbols or values to be coded to create a compact fit stream for each frame.

28. The method of claim 27 wherein step (1) comprises the following sequential steps:

- (a) Optional block based motion compensation;
- 15 (b) Temporal prediction; and
- (c) Replenishment.

29. The method of claim 27 wherein the reordering of symbols or values of step (3) comprises variable length based coding.

30. The method of claim 27 wherein the reordering of symbols or values  
20 of step (3) comprises statistical based coding.

31. The method of claim 27 further comprising the step of activating an alarm if the temporal decorrelation of step (1) indicates that an image frame has changed.

32. The method of claim 26 further including the step of storing said  
25 data for later transmission.

33. The method of claim 26 wherein the step of transmitting the data further indicates the steps of:

transmitting the data as individual frames of video data, said individual frames including key frames and predicted frames, each frame including  
30 a check sum or cyclic redundancy check appended to enable a receiver at the portable monitor device to assess if the frame has been received in error;

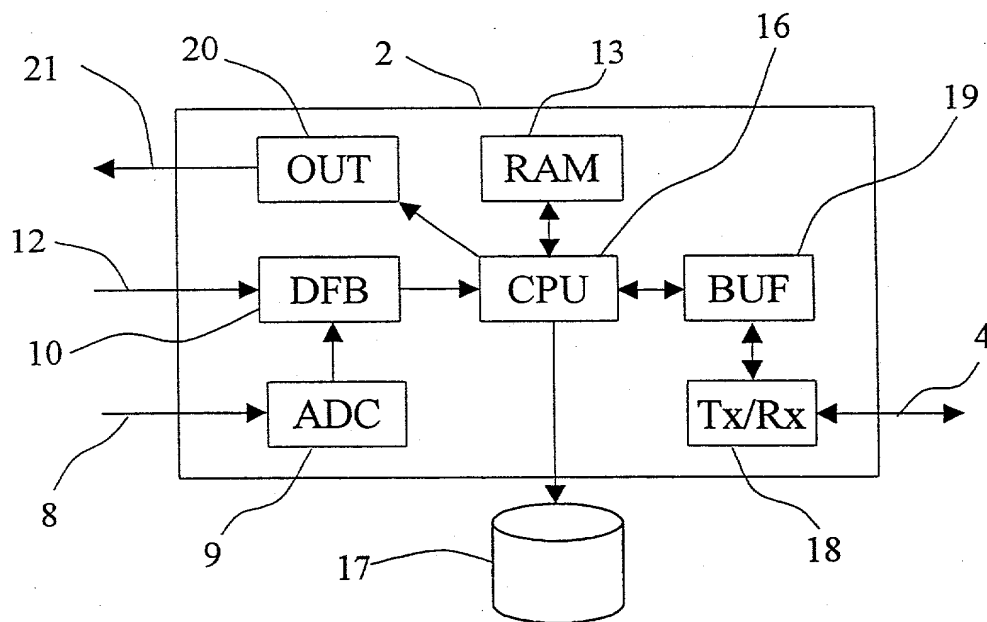
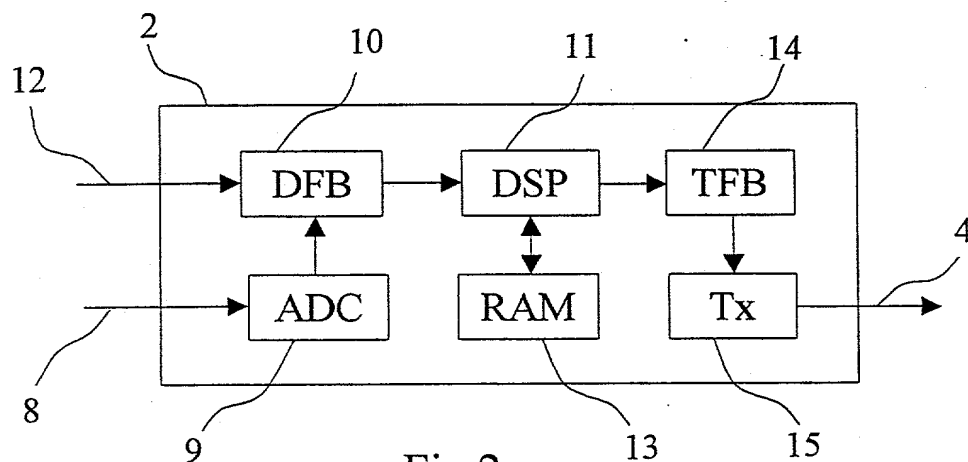
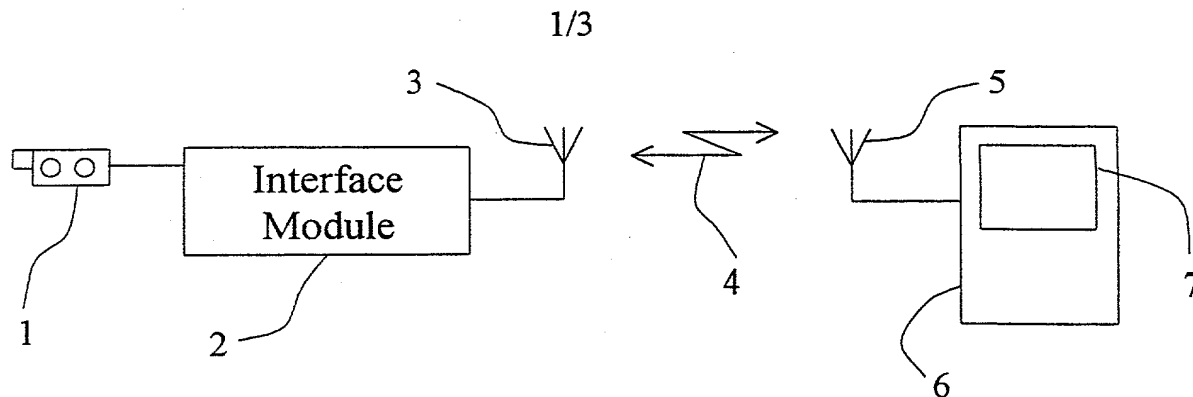


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if the frame is in error, discarding the frame and transmitting a status message indicating an identifier of the frame that is in error;  
stopping the transmitting of predicted frames and transmitting the next available keyframe; and

- 5 after transmitting the keyframe resuming transmitting predicted frames.

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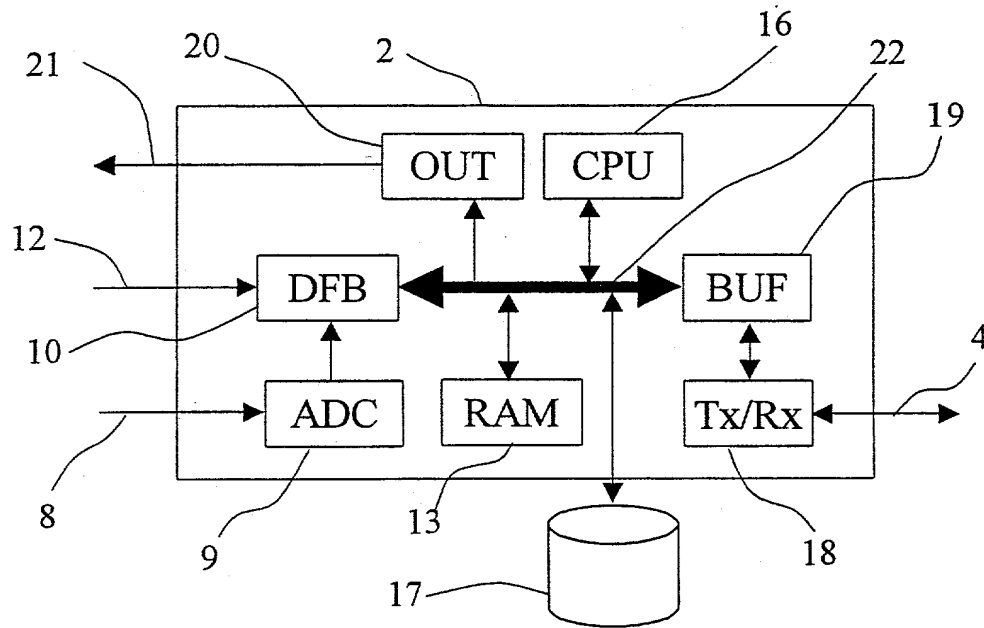


Fig 4

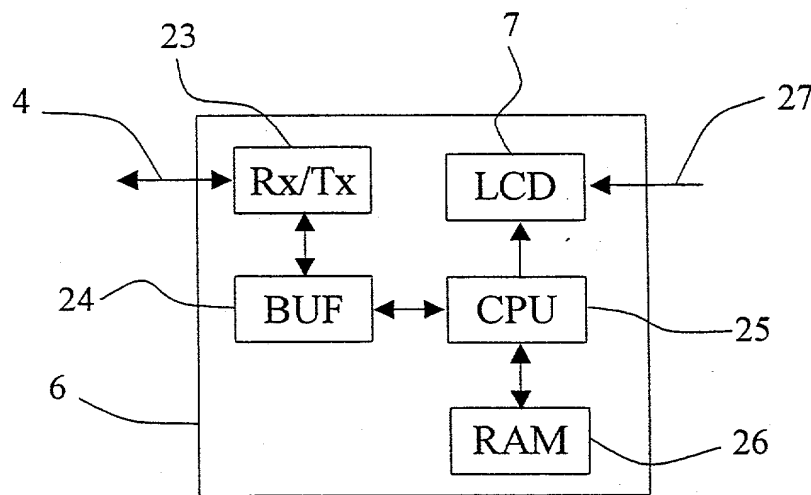


Fig 5

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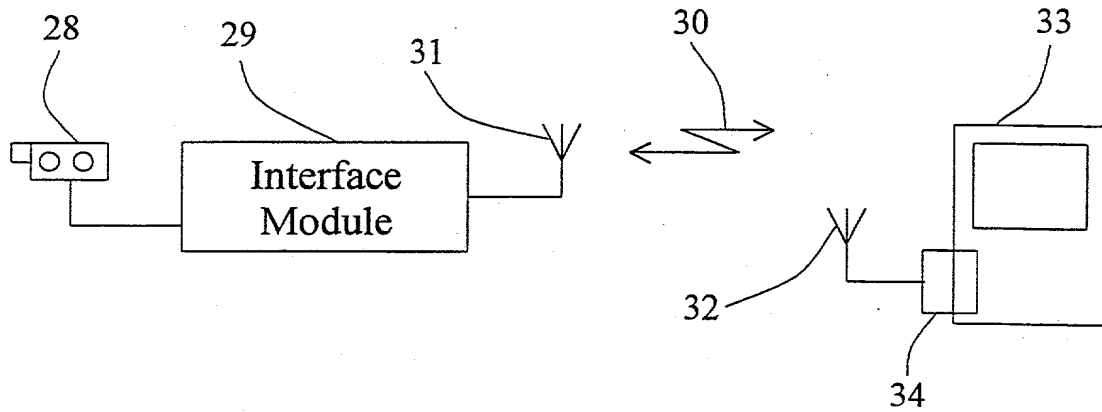


Fig 6

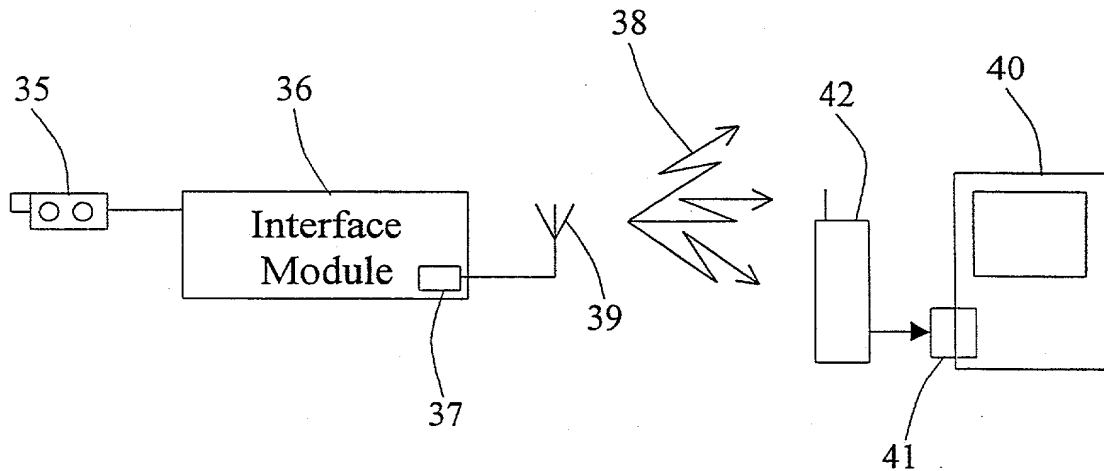


Fig 7

<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b>	Attorney Docket Number	4383P
	First Named Inventor	Ruben GONZALEZ
	<b>COMPLETE IF KNOWN</b>	
	Application Number	
	Filing Date	
	Group Art Unit	
	Examiner Name	

☒ Declaration Submitted with Initial Filing
 OR
 ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)) required)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled "WIRELESS VIDEO SURVEILLANCE SYSTEM", the specification of which is attached hereto unless the following box is checked:

- ☒ was filed as PCT International Application Number PCT/AU 00/00364 and was amended on February 20, 2000 and May 11, 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) of 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATIONS				
Number(s)	Country	Filing Date	Priority Claimed	Certified Copy Attached?
PP9901	AUSTRALIA	22 APRIL 1999	YES	NO

I hereby claim the benefit under 35 U.S.C. 119(3) of any United States provisional application(s) listed below.

Parsons Behle & Latimer  
201 South Main Street, Suite 1800  
Salt Lake City, Utah 84111-2218  
USA

Application Number(s)	Filing Date

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

U.S. Parent Application or PCT Parent Number	Parent Filing Date	Parent Patent Number (if applicable)
PCT/AU 00/00364	26 APRIL 2000	---

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: LLOYD W. SADLER, Reg. No. 40,154.

Direct all correspondence to: Parsons Behle & Latimer, 201 South Main Street, Suite 1800, Salt Lake City, Utah 84111-2218, United States of America. Phone (801) 532 1234 and Facsimile (801) 536 6111.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful, false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's signature:  Date: 9/10/2001

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